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ALLOFEEDING IN EURASIAN SISKINS (*CARDUELIS SPINUS*)

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Birds pass food to each other in three principal situations: adults feeding their young, males feeding their mates, and "allofeeding." As defined by Smith (1980), this last often occurs between members of the same sex, is not restricted to the breeding season, commonly entails refusal of the proffered food, and includes little or no food solicitation. Allofeeding has been described in only three highly social species: the Florida Scrub Jay (*Aphelocoma c. coerulescens*; Woolfenden and Fitzpatrick 1977), the Arabian Brown Babbler (*Turdoides squamiceps*; Zahavi *in* Smith 1980), and the Social Weaver (*Philetairus socius*; Collias and Collias 1978).

In a long-term investigation of the social behavior of captive Eurasian Siskins (*Carduelis spinus*; Senar 1982), I witnessed many instances of allofeeding between two males. The original group was formed in November 1977 and consisted of two adult males (N and A) and two adult females (B and G). In 1980, A paired with B and reared three young, two males (H and L) and a female (W). Also in spring 1980, N paired with G and in spring 1981, L paired with B, but failed to raise young.

From March 1979 to April 1981, during a total of 60 h of observation, I recorded more than 3,000 confrontations and was able to work out dominance relationships among the birds.

Passing food has already been described for the Eurasian Siskin (Zablotskaya 1978, Mundinger 1979). Mundinger defined this behavior as an "early stage of courtship feeding that can occur between males as well as heterosexually" (1979:273), and used it as a yardstick of social bonding. The first of Smith's criteria for allofeeding, i.e., that members of the same sex often try to feed each other, is true for the Eurasian Siskin. Both Mundinger (1979) and I, however, saw food being passed only between males, never between females.

Smith's criterion that allofeeding is not restricted to the breeding season is also true for the Eurasian Siskin. Wild siskins breed usually from April to June (Eriksson 1970, Newton 1972, Nethersole-Thompson and Watson 1974). My captive siskins showed breeding activity from February to August. I observed allofeeding from November to the end of June, with a peak from February to June. Although allofeeding was not restricted to the breeding season, it was most frequent during the phase before hatching.

Smith's assumptions that allofeeding birds commonly refuse food and show little or no food solicitation are not true for the Eurasian Siskin. This species not only does not refuse food offered by others but, on the contrary, demands it. I noted that in both same-sex and opposite-sex situations, the individual who gave the food behaved in the same way: its body remained upright, its feathers sleeked with the occasional exception of the crown, and it performed the same regurgitation movements as does a male toward his female (Fig. 1). In addition, the recipient's feathers were always fluffed up, and although it did not crouch, its head remained withdrawn and sometimes the wings trembled slightly; these behaviors are typical of a female (Fig. 1). The male who received the food opened and closed its beak in the same way as a female and took the food gently from the inside of the other bird's beak. Sometimes the receiving bird pecked gently at the giver's beak, while at other times, it was the other way round; this could be interpreted as a solicitation.

All of the instances of allofeeding involved individuals with a clear hierarchical relationship. The instances of allofeeding took place between the alpha male (N) and his clearly subordinate A in all the phases of the study that were appropriate for allofeeding. They also occurred between N and his subordinate, L, but only in the phase when L was more clearly subordinate to N (at the end of March 1981). Food was always passed from the subordinate to the dominant, which corroborates Smith's theory (1980) that the receiving of food is correlated with dominance.

At the beginning of the allofeeding period, this behavior sometimes appeared after a fight. In such fighting, the mutual aggressive pecking of beaks (the A6 display in Senar 1982) became progressively less violent and became a mutual touching and scissoring of the beaks. Consequently, the two birds were able to stay close to each other without aggression. As the breeding season advanced (by March or April), I could observe a true passing of food, which paralleled the rise of mutual tolerance of the male birds involved. The development of allofeeding was in some ways similar to that of heterosexual courtship feeding (Hinde 1955, 1956, Dilger 1960). These two kinds of food passing neither seemed to interfere with each other, nor did the occurrence of allofeeding between males seem to affect the normal development of male-female relationships. In spring 1979, I often witnessed sequences of food passing between N and A, in between true courtship feeding between A and his mate, B. However, once the chicks had hatched, allofeeding quickly became less frequent as male A focused his efforts on feeding his chicks.

Eurasian Siskins are highly sociable, often forming flocks even during the breeding season (Diesselhorst and Popp 1963, Nethersole-Thompson and Watson 1974). They also build nests close to each other (15–25 m apart), forming colonies of up to six pairs. Nethersole-Thompson also observed that males sometimes fly about together visiting their females.

These findings show strong integration within flocks of siskins. Hence, I agree with Mundinger (1970, 1979), that allofeeding may aid this integration by reducing aggression, especially during the breeding season, when birds are more pugnacious.

FIGURE 1. Allofeeding between two male Eurasian Siskins; alpha male on the left.

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INTERSPECIFIC ALLOPREENING BETWEEN CRESTED CARACARA AND BLACK VULTURE

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Interspecific allopreening has rarely been reported among birds. The majority of reported events involve the Brown-headed Cowbird (*Molothrus ater*), in which allopreening is associated with a "preening invitation" or "head-down" display (Selander and La Rue 1961; Selander 1964; Dow 1968; Rothstein 1977, 1980; Scott and Grustrup-Scott 1983). It has also been reported for Brewer's Blackbird (*Euphagus cyanocephalus*) and Red-winged Blackbird (*Agelaius phoeniceus*; Verbeek et al. 1981), as well as for other cowbirds (Harrison 1963, Selander 1964). Among raptors, interspecific allopreening has been reported between a caged Tawny Owl (*Strix aluco*) and a Little Owl (*Athene noctua*; Harrison 1965). To our knowledge, however, such behavior has not been reported between any raptors in nature. We report here our observations of allopreening between a Black Vulture (*Coragyps atratus*) and a Crested Caracara (*Polyborus plancus*). Intraspecific allopreening has been reported for the vulture in nature (Haverschmidt 1977) and for caged caracaras (Harrison 1969), so the mechanism for allopreening appears to be present in both species. Our observations may shed some light on the general nature and function of this unusual behavior.

On 13 December 1982, approximately 12 miles east of Refugio, Refugio Co., Texas, we observed a Black Vulture and an immature Crested Caracara allopreening. The incident began at 12:00 as we were watching these birds, which were perched on the cross-arm of a utility pole. A total of about 12 allopreening events occurred between the two birds in 20 min. A second Black Vulture was also perched on the cross-arm at first, but flew off without interacting with the other two birds. In a typical preening event, the caracara turned toward the vulture with head lowered and bill down, similar to the "head-down" display described by Selander and La Rue (1961) and Rothstein (1977, 1980). The vulture responded by preening the caracara on the back of the head and nape. The vulture once turned toward the caracara with a lowered head, which resulted in its being preened by the caracara. The two birds in a more upright position also pecked several times at each other's breast feathers. No other displays or activities were observed, and at no time during the observation did the birds move away from each other.

The head-down display of cowbirds is presumed to be given by a dominant bird in assessing agonistic tendencies of flock members (Rothstein 1980), and may aid a bird in joining a flock for foraging or roosting purposes (Scott and Grumstrup-Scott 1983). The dominance or subordinance of the caracara in presenting itself as it did could not be established. The kind of preening observed may be the result of a general response when one bird approaches another (Rothstein 1980). However, this display and preening may allow caracaras to join Black Vultures for foraging and roosting. Advantages of the display in allowing a cowbird to join a flock for foraging and roosting may apply equally to the caracara.

This single observation should not be taken to indicate that allopreening between the Crested Caracara and Black Vulture occurs rarely. In southeast Texas, the two species are often present near each other, so more observations at shared roost sites are needed to determine the frequency of the event. If the hypothesis of agonistic assessment and flocking benefits holds true for these species, we may expect that the head-down display and allopreening are not rare. Allopreening between these raptors may parallel that among icterids.

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